



Structural monitoring

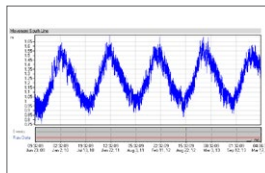
Infrastructure | Buildings | Industrial structures

# ROBO<sup>®</sup>SMART Monitoring – making bridge components intelligent



## ROBO<sup>®</sup>SMART for Expansion Joints

ensuring safety and reducing life-cycle costs



**mageba**



# Integrated smart system for expansion joints

## Introduction

Bridge expansion joints compensate the deformations of a bridge relative to the ends of the bridge. They ensure the continuity of the carriageway (serviceability) whilst avoiding restraint loads. Their life expectancy depends on traffic loading, accumulated movements, climatic conditions, and above all the type of expansion joint and the quality of its design, fabrication and installation.

The use of a ROBO®SMART monitoring system can enable the life-cycle cost of an expansion joint to be optimised. Using such a system, the structure's behaviour can be assessed on the basis of continuously measured parameters, with data viewable online at any time of day or night.

## mageba smart joints

mageba has an extensive track record of supplying structural health monitoring (SHM) systems for various applications, and is also a leading manufacturer of expansion joints for bridges and other structures. Combining the company's expertise in both fields enables it to now offer "smart" expansion joints. Any type of expansion joint from mageba's wide range can be designed and manufactured with an integrated SHM system – considerably simplifying its installation and reducing the total cost of ownership. Therefore, the potential use of an SHM system should ideally be considered already when specifying the expansion joint. Previously installed expansion joints can also be retrofitted with an SHM system where required.

## Features

- Small, self-powered and integrated acquisition unit
- Precise and durable sensors
- Robust electronics
- Data transfer via 3G GSM network
- 24-hour online data presentation via secure web interface

- Download of measured data
- Assembly on expansion joint in factory or on site

## Sample benefits for the end user

- Measurement of accumulated movements leading to optimisation of maintenance intervals
- Warnings in case of passing of certain thresholds (e.g. movements, vibrations, rotations)
- Real-time availability of various parameters (e.g. structural and air temperature, bridge deck displacement, etc.)
- Measurement of maximum movements for expansion joint replacement projects, leading to optimised design of the new expansion joints based on actual required rotational and movement capacities

## ROBO®SMART for expansion joints – Key data:

Measurements: Displacement, sliding gap, inclination (max, min, accumulated), temperature

Hardware: Sensors, acquisition unit, 3G router, battery, solar panels, durable enclosures

Software: Secure web interface

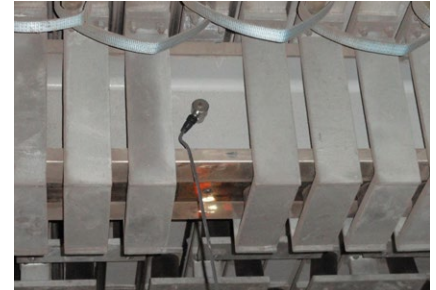
Installation: Integrated ex-works on joint, installation manual or complete installation by mageba on site

Accuracy: From 5mm to 0.01mm

Frequency: From 1 value per hour to 100Hz

## Option:

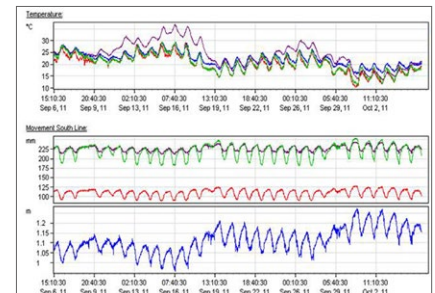
Damage detection by automated vibration measurements, using additional high precision accelerometers at frequencies of up to 25.6kHz



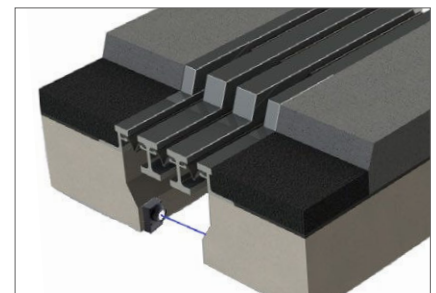
Vibration measurements on an expansion joint



Data acquisition unit of a monitoring system



Data check online



Installed expansion joint with displacement sensor

## mageba ROBO®CONTROL systems



"Portable"



Permanent "BASIC"



Permanent "ADVANCED"

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